WHAT IS CLAIMED:

1. A method, comprising:

approximating at least one non-power-of-2 element of a matrix as a power-of-2 element such that all elements of a resultant matrix are power-of-2 elements; and

encoding video data using the resultant matrix.

2. A method according to Claim 1, wherein the matrix is a DCT (discrete cosine transform) matrix.

3. A method according to Claim 1, wherein the approximating includes manipulating an order of the one or more elements in a particular row of the matrix.

4. A method according to Claim 1, wherein the approximating includes manipulating the signs of the one or more elements in a particular row of the matrix.

5. A method according to Claim 1, wherein the approximating includes manipulating an order and the signs of the one or more elements in a particular row of the matrix.

6. A method according to Claim 1, wherein the approximating includes approximating floating point coefficients as power-of-2 coefficients to preserve a threshold relationship between among the floating point coefficients.

7. A method according to Claim 1, wherein the approximating includes approximating floating point coefficients as power-of-2 coefficients to preserve a relative ratio among the floating point coefficients.

8. A method according to Claim 1, wherein V_i (i = 0-7) are row vectors or basis with unity magnitude, s_i are scaling factors, and the resultant matrix is $T = [s_i V_i]^T$, wherein further V_i are orthogonal to each other and s_i=1.

9. A method according to Claim 1, wherein the row vectors of the resultant matrix are orthogonal.

10. A method according to Claim 1, wherein the resultant matrix is

$$T_2 = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ a & b & c & d & -d & -c & -b & -a \\ e & f & -f & -e & -e & -f & f & e \\ c & d & -a & -b & b & a & -d & -c \\ 1 & -1 & -1 & 1 & 1 & -1 & -1 & 1 \\ b & -a & -d & c & -c & d & a & -b \\ f & -e & e & -f & -f & e & -e & f \\ d & -c & b & -a & a & -b & c & -d \end{pmatrix}$$

11. A method according to Claim 1, wherein the resultant matrix is

$$T_2 = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ a & b & c & d & -d & -c & -b & -a \\ e & f & -f & -e & -e & -f & f & e \\ c & d & -a & -b & b & a & -d & -c \\ 1 & -1 & -1 & 1 & 1 & -1 & -1 & 1 \\ b & -a & -d & c & -c & d & a & -b \\ f & -e & e & -f & -f & e & -e & f \\ d & -c & b & -a & a & -b & c & -d \end{pmatrix}$$

wherein further, for floating point coefficients a, b, c, d, e, and f:

$a \geq b \geq c \geq d$ and $e \geq f$,

$ab = ac + cd + bd$, and

a, b, c, d, e, and f are power-of-2.

12. A method according to Claim 11, wherein the resultant matrix is further expressed as the power-of-2 transform matrix:

$$T_3 = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 2 & 2 & 1 & 2^{-2} & -2^{-2} & -1 & -2 & -2 \\ 2 & 1 & -1 & -2 & -2 & -1 & 1 & 2 \\ 1 & 2^{-2} & -2 & -2 & 2 & 2 & -2^{-2} & -1 \\ 1 & -1 & -1 & 1 & 1 & -1 & -1 & 1 \\ 2 & -2 & -2^{-2} & 1 & -1 & 2^{-2} & 2 & -2 \\ 1 & -2 & 2 & -1 & -1 & 2 & -2 & 1 \\ 2^{-2} & -1 & 2 & -2 & 2 & -2 & 1 & -2^{-2} \end{pmatrix}$$

13. A method according to Claim 11, wherein floating point coefficients $a = b = 2$, $c = 1$, $d = ¼$, $e = 2$, $f = 1$, and wherein further multiplication for non-integer d is implemented by a two-bit right shift.

14. A method according to Claim 11, wherein floating point coefficients a=2, b=2, c=1, d=½, e=2, f=1, and wherein further multiplication for non-integer d is implemented by a two-bit right shift.

15. An image data encoding apparatus, comprising:

a transformer to perform a 2-power transform on an incoming array of pixels;

a quantizer to quantize the transformer result; and

an inverse transformer to perform an inverse 2-power transform on the quantizer result.

16. An apparatus according to Claim 15, wherein the transformer is to perform the 2-power transform using a symmetrical matrix in which all elements are expressed as power-of-2 elements.

17. An apparatus according to Claim 16, wherein an order of two or more elements in a particular row of the matrix have been changed.

18. An apparatus according to Claim 16, wherein the signs of one or more elements in a particular row of the matrix have been changed.

19. An apparatus according to Claim 16, wherein the symmetrical matrix is a DCT matrix template.

20. An apparatus according to Claim 16, wherein a template of the matrix is

$$T_2 = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ a & b & c & d & -d & -c & -b & -a \\ e & f & -f & -e & -e & -f & f & e \\ c & d & -a & -b & b & a & -d & -c \\ 1 & -1 & -1 & 1 & 1 & -1 & -1 & 1 \\ b & -a & -d & c & -c & d & a & -b \\ f & -e & e & -f & -f & e & -e & f \\ d & -c & b & -a & a & -b & c & -d \end{pmatrix}$$

21. An apparatus according to Claim 16, wherein a template of the matrix is

$$T_2 = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ a & b & c & d & -d & -c & -b & -a \\ e & f & -f & -e & -e & -f & f & e \\ c & d & -a & -b & b & a & -d & -c \\ 1 & -1 & -1 & 1 & 1 & -1 & -1 & 1 \\ b & -a & -d & c & -c & d & a & -b \\ f & -e & e & -f & -f & e & -e & f \\ d & -c & b & -a & a & -b & c & -d \end{pmatrix}$$

wherein further, for floating point coefficients a, b, c, d, e, and f:

$a \geq b \geq c \geq d$ and $e \geq f$,

$ab = ac + cd + bd$, and

a, b, c, d, e, and f are power-of-2 coefficients.

22. An apparatus according to Claim 16, wherein the matrix is the following power-of-2 transform matrix:

$$T_3 = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 2 & 2 & 1 & 2^{-2} & -2^{-2} & -1 & -2 & -2 \\ 2 & 1 & -1 & -2 & -2 & -1 & 1 & 2 \\ 1 & 2^{-2} & -2 & -2 & 2 & 2 & -2^{-2} & -1 \\ 1 & -1 & -1 & 1 & 1 & -1 & -1 & 1 \\ 2 & -2 & -2^{-2} & 1 & -1 & 2^{-2} & 2 & -2 \\ 1 & -2 & 2 & -1 & -1 & 2 & -2 & 1 \\ 2^{-2} & -1 & 2 & -2 & 2 & -2 & 1 & -2^{-2} \end{pmatrix}$$

23. An apparatus according to Claim 16, wherein V_i (i = 0-7) are row vectors or basis with unity magnitude, s_i are scaling factors, and the matrix is $T = [s_i V_i]^T$, wherein further V_i are orthogonal to each other and s_i=1.

24. An apparatus according to Claim 16, wherein the row vectors of the matrix are orthogonal.

25. A computer-readable medium having one or more instructions causing one or more processors to:

create a matrix such that all elements in the matrix are expressed as power-of-2 coefficients; and

encode video data using the resultant matrix.

26. A computer-readable medium according to Claim 25, wherein to create the matrix is to change at least one of an order of one or more elements in a particular row of a template matrix.

27. A computer-readable medium according to Claim 25, wherein to create the matrix is to change the sign of at least one element in a particular row of a template matrix.

28. A computer-readable medium according to Claim 25, wherein to create the matrix is to approximate floating point coefficients *a, b, c, d, e,* and *f* of a template matrix such that:

$a \geq b \geq c \geq d$ and $e \geq f$,

$ab = ac + cd + bd$, and

a, b, c, d, e, and *f* are power-of-2 coefficients.

29. A computer-readable medium according to Claim 28, wherein a template of the matrix

$$T_2 = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ a & b & c & d & -d & -c & -b & -a \\ e & f & -f & -e & -e & -f & f & e \\ c & d & -a & -b & b & a & -d & -c \\ 1 & -1 & -1 & 1 & 1 & -1 & -1 & 1 \\ b & -a & -d & c & -c & d & a & -b \\ f & -e & e & -f & -f & e & -e & f \\ d & -c & b & -a & a & -b & c & -d \end{pmatrix}$$

floating point coefficients $a = b = 2$, $c = 1$, $d = ¼$, $e = 2$, $f = 1$, multiplication for non-integer d is implemented by a two-bit right shift, and

wherein the matrix is expressed as the power-of-2 transform matrix:

$$T_2 = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 2 & 2 & 1 & 2^{-2} & -2^{-2} & -1 & -2 & -2 \\ 2 & 1 & -1 & -2 & -2 & -1 & 1 & 2 \\ 1 & 2^{-2} & -2 & -2 & 2 & 2 & -2^{-2} & -1 \\ 1 & -1 & -1 & 1 & 1 & -1 & -1 & 1 \\ 2 & -2 & -2^{-2} & 1 & -1 & 2^{-2} & 2 & -2 \\ 1 & -2 & 2 & -1 & -1 & 2 & -2 & 1 \\ 2^{-2} & -1 & 2 & -2 & 2 & -2 & 1 & -2^{-2} \end{pmatrix}$$

30. A computer-readable medium according to Claim 28, wherein a template of the matrix is

$$T_2 = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ a & b & c & d & -d & -c & -b & -a \\ e & f & -f & -e & -e & -f & f & e \\ c & d & -a & -b & b & a & -d & -c \\ 1 & -1 & -1 & 1 & 1 & -1 & -1 & 1 \\ b & -a & -d & c & -c & d & a & -b \\ f & -e & e & -f & -f & e & -e & f \\ d & -c & b & -a & a & -b & c & -d \end{pmatrix}$$

floating point coefficients a=2, b=2, c=1, d=½, e=2, f=1, multiplication for non-integer d is implemented by a two-bit right shift, and

wherein the matrix is expressed as the power-of-2 transform matrix:

$$T_3 = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 2 & 2 & 1 & 2^{-2} & -2^{-2} & -1 & -2 & -2 \\ 2 & 1 & -1 & -2 & -2 & -1 & 1 & 2 \\ 1 & 2^{-2} & -2 & -2 & 2 & 2 & -2^{-2} & -1 \\ 1 & -1 & -1 & 1 & 1 & -1 & -1 & 1 \\ 2 & -2 & -2^{-2} & 1 & -1 & 2^{-2} & 2 & -2 \\ 1 & -2 & 2 & -1 & -1 & 2 & -2 & 1 \\ 2^{-2} & -1 & 2 & -2 & 2 & -2 & 1 & -2^{-2} \end{pmatrix}$$

31. A computer-readable medium according to Claim 26, wherein the template matrix is a DCT matrix.

32. A computer-readable medium according to Claim 27, wherein the template matrix is a DCT matrix.

33. A computer-readable medium according to Claim 25, wherein V_i (i = 0-7) are row vectors or basis with unity magnitude, s_i are scaling factors, and the resultant matrix is $T = [s_i V_i]^T$, wherein further V_i are orthogonal to each other and s_i=1.

34. A computer-readable medium according to Claim 25, wherein the row vectors of the resultant matrix are orthogonal.

35. An image data encoding apparatus, comprising:

means for performing a 2-power transform on an incoming array of pixels;

means for quantizing the transformer result; and

means for performing an inverse 2-power transform on the quantizer result.